

**AMENDMENTS TO THE DRAWINGS:**

Four replacement sheets of drawings are attached to this paper and include changes to Figs. 1-3, 4A-4B, and 5. No changes were made to Fig. 4C. The changes to Figs. 1-3, 4A-4B, and 5 are discussed below in the Remarks under "Objection to the Drawings."

The replacement sheet containing Figs. 1-2 replaces the replacement sheet containing Figs. 1-2 filed with the amendment of September 7, 2005.

The replacement sheet containing Figs. 3 and 4A replaces the replacement sheet containing Figs. 3 and 4A filed with the amendment of September 7, 2005.

The replacement sheet containing Figs. 4B-4C replaces the replacement sheet containing Figs. 4B-4C filed with the amendment of September 7, 2005.

The replacement sheet containing Fig. 5 replaces the replacement sheet containing Fig. 5 filed with the amendment of September 7, 2005.

## REMARKS

In accordance with the foregoing, the specification and Figs. 1-3, 4A-4B, and 5 have been amended, and new claims 27-29 have been added. Claims 1-4 and 7-29 are pending, with claim 1 being independent. No new matter is presented in this amendment.

The specification has been amended to describe features shown in the drawings that are now recited in new claims 27-29.

In the first paragraph on page 6 of the Office Action of November 17, 2005, the Examiner states that "Applicant's arguments filed 10/31/05 have been fully considered but they are not persuasive." However, the applicants' remarks referred to by the Examiner were actually filed on September 7, 2005.

### Objection to the Drawings

The replacement drawings submitted with the amendment of September 7, 2005, were objected to "because proper hatchings are not shown in the cross sectional views to indicate the various materials used." As explained in the amendment of September 7, 2005, the hatchings in the previous drawings were deleted in those replacement drawings in response to the Examiner's objection to the use of straight cross hatching marks on certain elements in the previous drawings. As explained in the amendment of September 7, 2005, it is the applicants' position that hatchings are not required by Section IX of MPEP 608.02, and furthermore this section of the MPEP does not have symbols which are suitable for representing all of the various types of materials used in the present invention.

However, the Examiner has nevertheless required hatchings to be added to the cross-sectional views in the drawings. Accordingly, Figs. 1-3, 4A-4B, and 5 have been amended to add such hatchings. The most suitable hatchings that could be found have been used, but the use of any particular hatching on any particular element is not to be construed as limiting in any way the material from which that element may be made. It is also noted that many of the hatched elements are very thin, which makes it difficult to apply or see hatching marks other than straight cross hatching marks. Accordingly, it is respectfully requested that the objection to the drawings be withdrawn.

Claim Rejections Under 35 USC 103

Claims 1, 2, 4, 7, 9, 11-13, 16-18, and 20-25

Claims 1, 2, 4, 7, 9, 11-13, 16-18, and 20-25 were rejected under 35 USC 103(a) as being unpatentable over Chow (U.S. Patent No. 5,157,240) in view of Chandler (U.S. Patent No. 2,799,764) or Isaacson et al. (Isaacson) (U.S. Patent No. 3,842,241). This rejection is respectfully traversed.

Claims 1 and 23-24

The Examiner considers protective layer 25' of cover 11 in Figs. 2 and 4 of Chow to be "a heat-resistant layer formed on a surface of the cover heater" as recited in claim 1, and considers protective layer 25 that covers the body heater as shown in Figs. 1-3 and 7 of Chow to be "a heat-resistant layer on the surface of the body heater" as recited in claim 23.

The purpose of Chow's protective layer 25' is described in column 6, lines 29-35, of Chow which reads as follows:

Also, the covering of heating elements 22' and 24' by protective layer 25' keeps them from being exposed directly to the substrate on which thin films are being deposited. This avoids the incorporation into the films being deposited of contaminants arising from the heating of these heating elements.

However, nothing in this description indicates that protective layer 25' is "a heat-resistant layer" as recited in claim 1 as alleged by the Examiner.

The purpose of Chow's protective layer 25 is described in column 4, line 60, through column 5, line 3, of Chow which reads as follows:

All of this structure on the outer side of shell 20 is then finally covered by a protective layer, 25, of pyrolytic boron nitride, again deposited using a well known chemical vapor deposition process to a thickness of 1.0 to a few mils. Protective layer 25 prevents outer conductor 24 therebeneath from adsorbing gaseous impurities when out in the open which could later outgas at the crucible operating temperatures. Further, the pyrolytic graphite in outer heater 24, in the absence of protective layer 25, may react with residual molecules occurring thereabout even after a hard vacuum has been pulled therein.

However, nothing in this description indicates that protective layer 25 is "a heat-resistant layer" as recited in claim 23 as alleged by the Examiner.

Accordingly, for at least the reasons discussed above, it is submitted that Chow does not disclose "a heat-resistant layer formed on a surface of the cover heater" as recited in claim 1, or "a heat-resistant layer on the surface of the body heater" as recited in claim 23.

Substantially these same arguments were also presented in the amendment of September 7, 2005. In response to these arguments, the Examiner states as follows in the Office Action of November 17, 2005:

The applicant argues Chow the protective layers 25' and 25" made of pyrolytic boron nitride having 1.0 to a few mils thick would not be capable of acting as a heat-resistant layer. In the applicants' disclosure on page 7, paragraph (0035), it is disclosed that the heat-resistant layer 46 is formed as a thin film type. Since the applicant discloses the heat-resistant layer to be a thin-film type, the layer 25' or 25" of Chow being a thin layer of 1.0 to a few mils would be capable of acting as the heat-resistant layer. Likewise the layer 25 formed on the body heater would also be capable of acting as a heat-resistant layer.

The rationale for the Examiner's argument appears to be the same rationale that is set forth in MPEP 2112.01, Eighth Edition, Revision 3, August 2005, pages 2100-58 and 2100-59, which provides as follows in pertinent part:

**I. PRODUCT AND APPARATUS CLAIMS — WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT**

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. (Citation omitted.) "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not."

The Examiner apparently believes that Chow's protective layers 25' and 25 are the same as the "heat-resistant layer" recited in claims 1 and 23 because Chow's protective layers are made of pyrolytic boron nitride and are 1.0 to a few mils thick, and paragraph [0035] on page 7

of the applicants' specification states that "the heat-resistant layer 46 . . . is formed as a thin film type."

However, the fact is that claims 1 and 23 do not recite that the "heat-resistant layer" is made of pyrolytic boron nitride and are 1.0 to a few mils thick as are Chow's protective layers 25' and 25, nor does the applicants' specification disclose this. In light of this, and in light of the complete absence of any discussion whatsoever in Chow of protective layers 25' and 25 being "a heat-resistant layer" as recited in claims 1 and 23, it is submitted that the Examiner has not shown a sound basis for believing that Chow's protective layers 25' and 25 are the same as the "heat-resistant layer" recited in claims 1 and 23. Accordingly, it is submitted that the Examiner has not established a *prima facie* case of either anticipation or obviousness with respect to this feature of claims 1 and 23 pursuant to the portion of MPEP 2112.01 which is set forth above.

Accordingly, for at least the reasons discussed above, it is submitted that Chow does not disclose "a heat-resistant layer formed on a surface of the cover heater" as recited in claim 1, or "a heat-resistant layer on the surface of the body heater" as recited in claim 23.

As recognized by the Examiner, Chow does not disclose "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in claim 24. However, the Examiner considers these features to be disclosed by Chandler and Isaacson, and is of the opinion that it would have been obvious to incorporate these features of Chandler and Isaacson into Chow's device "to reflect the heat generated by the heater toward an intended heating direction."

Specifically, the Examiner considers Fig. 5 of Chandler to show that "the heating element (72) is provided on a heating surface (76) with a heat reflecting layer (62) disposed between the heating element and a heat resistant/insulating layer (78)."

However, as described in column 7, lines 35-38, of Chandler, layer 78 is "a backing layer 78 of paper, paperboard, cloth, or other suitable material," rather than being "a heat resistant/insulating layer" as alleged by the Examiner or a "heat-resistant layer" as recited in claims 1 and 24. Fig. 5 of Chandler does shown an insulating layer 68, but this insulating layer 68 is between heating element 72 and heat reflecting layer 62, and is an electrical insulating layer as described in column 7, lines 5-9, of Chandler, not a "heat-resistant layer" as recited in claims 1 and 24, such that Chandler does not disclose "a reflective layer between the cover

heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in claim 24.

Accordingly, for at least the reasons discussed above, it is submitted that Chandler does not suggest "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in claim 24.

With respect to Isaacson, the Examiner considers Figs. 2-3 of Isaacson to show "a heating surface (14) upon which a heating element (50) provided thereto with a heat reflective layer (56) disposed between the heating element and a heat resistant layer (40)."

However as described in column 2, lines 46-48, of Isaacson, element 40 is "a holder 40 which may be in the form of a picture frame holder and constructed of plastic," rather than being "a heat resistant layer" as alleged by the Examiner or a "heat-resistant layer" as recited in claims 1 and 24. Figs. 1-2 of Isaacson do show a thermal insulating board 52, but this thermal insulating board 52 is between heating element 50 and heat reflective layer 56, such that Isaacson does not disclose "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in claim 24.

Accordingly, for at least the reasons discussed above, it is submitted that Isaacson does not suggest "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in claim 24.

#### Claims 2 and 18

The Examiner considers Chow to disclose the feature of claim 2 "wherein the cover heater is formed as a single wire pattern laid over the entire top surface of the cover, the single wire pattern having a positive and a negative terminal at respective ends of the single wire pattern," and the feature of claim 18 "wherein the body heater is formed as a single wire pattern laid over the entire outer wall of the main body, the single wire pattern having a positive and a negative terminal at respective ends of the single wire pattern."

However, it is submitted that Chow does not disclose these features of claims 2 and 18 because the cover heaters and the body heaters in all of the embodiments disclosed by Chow are formed as two patterns, rather than as a single wire pattern as recited in claims 2 and 18. See inner heating element 22' and outer heating element 24' in Figs. 2 and 4 of Chow which show more detailed views of cover 11 in Fig. 1 of Chow, and inner heating element 22" and outer heating element 24" in cover 11' in Fig. 7 of Chow. See first layer heating element 22 and second layer heating element 24 in Figs. 1-3 and 7 of Chow.

Substantially these same arguments were also presented in the amendment of September 7, 2005. In response to these arguments, the Examiner states as follows in the Office Action of November 17, 2005:

With respect to claims 2 and 18, the applicants argue Chow has the cover heaters in two patterns rather than a single wire pattern as claimed by the applicants. Single wire pattern is covered or met by the two wire heating patterns of Chow. Likewise, the claimed body heater of a single wire pattern is covered within the two body wire patterns of Chow.

However, the problem with the Examiner's position is that the Examiner has apparently ignored the meaning of the word "single." According to the American Heritage Dictionary, Second College Edition, "single" means "not accompanied by another or others; sole," and means "one only, that is, not in accompaniment or association or combination with another or others." In light of this, it is submitted that Chow's two heating elements 22', 24' or 22", 24" or 22, 24 cannot be "a single wire pattern" as recited in claims 2 and 18.

Accordingly, for at least the reasons discussed above, it is submitted that Chow does not disclose the feature of claim 2 "wherein the cover heater is formed as a single wire pattern laid over the entire top surface of the cover, the single wire pattern having a positive and a negative terminal at respective ends of the single wire pattern," or the feature of claim 18 "wherein the body heater is formed as a single wire pattern laid over the entire outer wall of the main body, the single wire pattern having a positive and a negative terminal at respective ends of the single wire pattern."

Claims 7 and 25

The Examiner considers Chow to disclose the feature of claim 7 "wherein the insulating material forming the cover has a good heat radiation property," and the feature of claim 25 "wherein the insulating material forming the main body has a good heat radiation property," stating as follows in the Office Action of November 17, 2005:

With respect to claims 7 and 25, the applicants argue that the examiner has not discussed the recited insulating material having a good heat radiation. Chow shows a cover made of an insulating material as claimed in claim 1. Since both are made of the same "insulating" material, the recited properties are presumed inherent.

The rationale for the Examiner's argument appears to be the same rationale that is set forth in MPEP 2112.01 which was discussed above in connection with claims 1 and 23. That is, the Examiner apparently believes that Chow's cover 11 or 11' and main body 20 are made of an insulating material, and since claims 7 and 25 recite that the cover and the main body are made of an "insulating material," then Chow's cover 11 or 11' and main body 20 are made of the same "insulating material" that the cover and the main body recited in claims 7 and 25 are made of, and therefore Chow's insulating material has "a good heat radiation property" just like the "insulating material" recited in claims 7 and 25.

Chow's cover 11 or 11' and main body 20 are made of pyrolytic boron nitride which appears to be an electrical insulating material in light of column 3, lines 46-49, of Chow. However, the fact is that claims 7 and 25 do not recite that the "insulating material" is pyrolytic boron nitride as is Chow's insulating material, but recite that the "insulating material . . . has a good heat radiation property." Nothing in Chow indicates that pyrolytic boron nitride "has a good heat radiation property" as recited in claims 7 and 25, or that it is desirable that cover 11 or 11' and main body 20 be made of an "insulating material [which] has a good heat radiation property" as recited in claims 7 and 25. Since Chow discloses an insulating material which is pyrolytic boron nitride, and claims 7 and 25 recite an "insulating material [which] has a good heat radiation property," it is submitted that the insulating material disclosed in Chow is not the same as the insulating material recited in claims 7 and 25. In light of this, and in light of the complete absence of any discussion whatsoever in Chow about pyrolytic boron nitride having "a good heat radiation property" as recited in claims 7 and 25, it is submitted that the Examiner has not shown a sound basis for believing that Chow's cover 11 or 11' and main body 20 are made of an



"insulating material [which] has a good heat radiation property" as recited in claims 7 and 25. Accordingly, it is submitted that the Examiner has not established a *prima facie* case of either anticipation or obviousness with respect to this feature of claims 7 and 25 pursuant to the portion of MPEP 2112.01 which is set forth above in connection with claims 1 and 23.

Accordingly, for at least the reasons discussed above, it is submitted that Chow does not disclose the feature of claim 7 "wherein the insulating material forming the cover has a good heat radiation property," or the feature of claim 25 "wherein the insulating material forming the main body has a good heat radiation property."

#### Claim 9

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose the feature of claim 9 "wherein the cover heater is formed in a concentric pattern around the nozzle." However, the Examiner is of the opinion that it would have been obvious to modify Chow's cover heater to have this feature, stating as follows:

With respect to claim 9, Chow shows the cover having a nozzle in the center of the cover with a cover heater provided around the nozzle. However, while, Chow does not show that the cove heater concentric pattern around the nozzle, it would have been obvious to one of ordinary skill in the art to provide the cover heater in the concentric pattern or any other pattern to affectively provide uniform and stable heating across the cover.

However, the Examiner has not identified any motivation whatsoever in Chow, Chandler, and Isaacson for modifying Chow's cover heater to be "formed in a concentric pattern around the nozzle" as recited in claim 9. Rather, the only suggestion that this be done is contained in the applicants' disclosure, which the Examiner is prohibited from relying on to establish a *prima facie* case of obviousness by MPEP 2143 Eighth Edition, Revision 3, August 2005, page 2100-135, which provides as follows (emphasis by underlining added):

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the

prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. (Citation omitted.)

Furthermore, it is submitted that such a modification would be contrary to the statement in column 7, lines 6-10, of Chow which states that the multiple heating elements in Chow's cover provide very good temperature uniformity and reads as follows:

If apertures 19 are omitted, cover 11 can alteratively [sic] serve as a flat heater for heating substrates upon which material depositions are to be made. The multiple heating elements 22' and 24' will provide very good temperature uniformity across such a structure.

Accordingly, for at least the reasons discussed above, it is submitted that Chow does not disclose or suggest the feature of claim 9 "wherein the cover heater is formed in a concentric pattern around the nozzle."

These same arguments were also presented in the amendment of September 7, 2005. In response to these arguments, the Examiner states as follows in the Office Action of November 17, 2005 (emphasis added):

With respect to claim 9, the applicant argues the cover heater formed of the concentric pattern around the nozzle is not shown by the applied art and no motivation is identified. Chow teaches that having a uniform heating distribution of the heating elements is important to avoid hot and cold zones. Chow shows a heating wire that encircles a hole or nozzle but does not explicitly show the concentric pattern, but just as the applicant allows other forms of heating pattern to be used to form the heating pattern (see paragraph 31), it would have been obvious to one of ordinary skill to provide a concentric circle as well as other forms of heating pattern to achieve a uniform heating across the cover.

As is readily apparent from the underlined statement in the above passage, the Examiner has relied on statements in paragraph [0031] of the specification of the applicants' disclosure as part of the motivation to modify Chow's cover heater to be "formed in a concentric pattern around the nozzle" as recited in claim 9, a practice that is expressly prohibited by MPEP 2143 set forth

above. Accordingly, it is submitted that the Examiner has not established a *prima facie* case of obviousness with respect to claim 9 pursuant to MPEP 2143.

Furthermore, with respect to the Examiner's statement that "Chow teaches that having a uniform heating distribution of the heating elements is important to avoid hot and cold zones," it appears that this statement by the Examiner is based on column 1, lines 50-69, of Chow which reads as follows:

However, there are a number of difficulties in maintaining such a constant temperature in such a crucible and in avoiding contamination from crucible structure outgassing or decomposition. Deposition sources today typically have a serpentine conductive heating element positioned around the crucible at a distance therefrom, and the heating of the crucible will be mostly by radiation in these circumstances with little conduction. Such a heating element is often constrained to have a shape that often does not conform to the crucible shape thereby leading to low heating efficiency. In addition, the heater temperature as a result is going to be substantially higher than that to which the crucible is desired to be raised, a situation which causes added outgassing from the heater element and reduces its lifetime. The non-uniform spatial distribution of the heating elements means that the crucible will have resulting hot and cold zones making achieving of temperature uniformity difficult.

It is readily apparent from this passage that the hot and cold zones referred to by the Examiner result from the non-uniform distribution of a serpentine conductive heating positioned around the crucible at a distance therefrom. It is also apparent from column 3, line 59, through column 4, line 5, and column 4, lines 18-25, of Chow that Chow solves this problem by providing heating elements 22 and 24 closely adjacent to shell 20 as shown in Figs. 2 and 7 of Chow, not by providing heating elements 22' and 24' or 22" and 24" in a particular pattern on cover 11 or 11' as shown in Figs. 2, 4, and 7 of Chow. Accordingly, it is submitted that Chow's statement relied on by the Examiner cannot provide motivation to modify Chow's cover heater to be "formed in a concentric pattern around the nozzle" as recited in claim 9.

Accordingly, for at least the reasons discussed above, it is submitted that Chow does not disclose or suggest the feature of claim 9 "wherein the cover heater is formed in a concentric pattern around the nozzle."

Claim 16

Claim 16 recites that "the cover heater is formed as a heating block by spray coating a heat emitting material onto the cover." However, the Examiner did not discuss this feature of claim 16 in explaining the rejection, and it is not seen where this feature is disclosed or suggested in Chow, Chandler, and Isaacson.

Chow's cover heater is apparently formed the same way that Chow's body heater is formed, that is, by depositing pyrolytic graphite by chemical vapor deposition, selectively masking the resulting graphite surface, and etching away the unmasked portions. See column 3, lines 24-33, of Chow which describes the process of forming Chow's body heater.

Chandler's heater 44 shown in Figs. 3-4 of Chandler is described as follows in column 4, lines 18-23, of Chandler:

Affixed to layer 42, or embedded or impregnated therein is a suitable electrically conductive means 44 of sufficient heat dissipative capacity and inherent resistance, to provide a substantial heating effect from current passing therethrough.

Chandler's heater 72 shown in Figs. 5-6 of Chandler is described as follows in column 7, lines 22-30, of Chandler:

Next to the lower surface 70 of the insulating layer 68, is the resistance layer 72 which, like layer 44 of Figures 3 and 7, may be formed of any suitable resistance material as described therefor, including graphite, flake carbon, or carbon dispersion in a fluid medium which is allowed to dry, or other forms as mentioned, or metallic resistance coating also as mentioned, which will generate heat from electrical current passing therethrough,

Chandler's heater 100 shown in Figs. 9 and 11 of Chandler is described as follows in column 8, lines 19-24, of Chandler:

Looking at Figure 9, it is seen that here is another modified form of the inventive idea, in which there is a heat generating heat dissipating element 100 in sheet form, and formed in any manner described herein, either by carbon or metallic particles, or granules or the like, or otherwise, for dissipating heat therefrom on passage of electric current therethrough.

Isaacson's heater element 50 shown in Figs. 2-3 of Isaacson includes a conductive element 51 in the form of a thin metal sheet or a loop of nichrome wire. See column 2, lines 59-61, of Isaacson.

It is submitted that nothing whatsoever in the passages of Chow, Chandler, and Isaacson discussed above or any other portion of Chow, Chandler, and Isaacson discloses or suggests the feature of claim 16 "wherein the cover heater is formed as a heating block by spray coating a heat emitting material onto the cover."

Accordingly, for at least the reasons discussed above, it is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the feature of claim 16 "wherein the cover heater is formed as a heating block by spray coating a heat emitting material onto the cover."

These same arguments were also presented in the amendment of September 7, 2005. In response to these arguments, the Examiner states as follows in the Office Action of November 17, 2005:

With respect to claim 16, the applicant argues the cover heater is formed by spray coating. It is noted that the patentability of an apparatus is determined by the product itself and not by the which it is made. See also MPEP 2113.

The Examiner is presumably relying on the portion of MPEP 2113 which provides as follows (emphasis added):

**2113 Product-by-Process Claims**

**PRODUCT-BY-PROCESS CLAIMS ARE NOT LIMITED TO THE MANIPULATIONS OF THE RECITED STEPS, ONLY THE STRUCTURE IMPLIED BY THE STEPS**

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." (Citation omitted.). . .

The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to

impart distinctive structural characteristics to the final product.  
(Citation omitted)

However, the Examiner has apparently overlooked the fact that claim 16 does not merely recite that "the cover heater is formed . . . by spray coating," but also recites that "the cover heater is formed as a heating block." It is submitted that the "heating block" recited in claim 16 is a structural feature which must be considered pursuant to the portion of MPEP 2113 which is set forth above.

It is submitted that Chow's cover heater is not a "heating block" as recited in claim 16 because the heater in cover 11 is formed by inner heating element 22' and outer heating element 24' as shown in Figs. 2 and 4 of Chow, and the heater in cover 11' is formed by inner heating element 22" and outer heating element 24" as shown in Fig. 7 of Chow. It is submitted that neither of these heaters is a "heating block" as recited in claim 16 because they are formed by two separate patterned heating elements arranged in two layers. Nor is it seen where this feature of claim 16 is suggested by Chow, or is disclosed or suggested by Chandler and Isaacson.

Accordingly, for at least the reasons discussed above, it is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the feature of claim 16 "wherein the cover heater is formed as a heating block."

#### Claim 20

The Examiner considers Chow to disclose the feature of claim 20 "wherein the body heater is further formed over the bottom of the main body," although the Examiner did not point out where this feature is disclosed in Chow, making it difficult to respond to the rejection. However, it is submitted that Chow does not disclose or suggest this feature of claim 20 as alleged by the Examiner.

Main body 10 shown in Figs. 1-2 and 7 of Chow is conical in shape, and it is readily apparent from Figs. 1-2 and 7 that the body heater (first layer heating element 22 and second layer heating element 24) is not further formed over the bottom of main body 10 as apparently alleged by the Examiner, but is formed only over the sides of main body 10.

Column 5, lines 14-18, of Chow states as follows:

Although crucible 10 is shown in FIGS. 1 and 2 to be conical-like in shape, other shapes are possible and even made more feasible by the use of thin film heaters deposited directly on the inner or outer walls of the containment vessel.

It is submitted that nothing whatsoever in this portion of Chow or in any other portion of Chow discloses the feature of claim 20 "wherein the body heater is further formed over the bottom of the main body" as alleged by the Examiner. Nor is it seen where this feature of claim 20 is suggested by Chow, or is disclosed or suggested by Chandler and Chow.

These same arguments were also presented in the amendment of September 7, 2005. In response to these arguments, the Examiner states as follows in the Office Action of November 17, 2005:

With respect to claim 20, the applicant argues that Chow does not show the body heater formed over the bottom of the main body. It is shown in Figure 2, a body heater that is formed throughout the main body including the top and middle and bottom of the main body.

Thus, the Examiner considers shell 20 in Fig. of Chow which the Examiner apparently considers to be a "main body" as recited in claim 20 to have a top, a middle, and a bottom, and considers Chow's body heater formed by first layer heating element 22 and second layer heating element 24 to be formed throughout shell or "main body" 20 including the top, middle, and bottom of shell or "main body" 20, thereby providing the feature of claim 20 "wherein the body heater is further formed over the bottom of the main body." However, the top, middle, and bottom of Chow's shell or "main body" referred to by the Examiner are completely arbitrary divisions of Chow's shell or "main body" 20 created by the Examiner for the sole purpose of rejecting claim 20. Chow does not recognize any such divisions of shell or "main body" 20.

Furthermore, the Examiner has apparently ignored that fact that claim 20 depends from claim 18, and claim 18 recites that "the body heater is formed as a single wire pattern laid over the entire outer wall of the main body," while claim 20 recites that "the body heater is further formed over the bottom of the main body." Since claim 18 recites that "the body heater is formed . . . over the entire outer wall of the main body," and claim 20 recites that "the body heater is further formed over the bottom of the main body," it is submitted that "the bottom of the main body" recited in claim 20 cannot be part of "the entire outer wall of the main body" recited in claim 18 because the phrase "is further formed over the bottom of the main body" in claim 20

means that the body heater is formed over an additional portion of the main body where it has not yet been formed, and claim 18 recites that the body heater has already been formed "over the entire outer wall of the main body." Accordingly, it is submitted that the portion of the body heater that is further formed in claim 20 must be formed over something other than "the entire outer wall of the main body," such that "the bottom of the main body" recited in claim 20 is not part of "the outer wall of the main body" recited in claim 18.

Accordingly, assuming that Fig. 2 may arguably be considered to show that Chow's body heater formed by first layer heating element 22 and second layer heating element 24 "is formed throughout the main body including the top and middle and bottom of the main body" as interpreted by the Examiner, it is submitted that this corresponds to the feature of claim 18 "wherein the body heater is formed . . . over the entire outer wall of the main body." Since this accounts for Chow's entire body heater, there is no remaining portion of Chow's body heater which arguably could be considered to be "further formed over the bottom of the main body" as recited in claim 20.

Accordingly, for at least the reasons discussed above, it is submitted that Chow does not disclose the feature of claim 20 "wherein the body heater is further formed over the bottom of the main body."

#### Conclusion—Claims 1, 2, 7, 9, 16, 18, 20, and 23-25

Since Chow, Chandler, and Isaacson do not disclose or suggest the features of claims 1, 2, 7, 9, 16, 18, 20, and 23-25 discussed above, it is submitted that claims 1, 2, 7, 9, 16, 18, 20, and 23-25 are patentable over these references, and it is respectfully requested that the rejection of claims 1, 2, 7, 9, 16, 18, 20, and 23-25 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson be withdrawn.

#### Claims 4, 11-13, 17, and 21-22

Notwithstanding the position taken by the Examiner, it is noted that claims 4, 11-13, 17, and 21-22 depend directly or indirectly from claim 1, and thus recite all of the features recited in claim 1 together with further features of the present invention.



Accordingly, it is submitted that claims 4, 11-13, 17, and 21-22 are patentable over Chow, Chandler, and Isaacson for at least the reasons discussed above that claim 1 is patentable thereover, and it is respectfully requested that the rejection of claims 4, 11-13, 17, and 21-22 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson be withdrawn.

#### Claims 3, 14, and 19

Claims 3, 14, and 19 were rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, and 20-25, and further in view of Kano et al. (Kano) (U.S. Patent No. 6,242,719). This rejection is respectfully traversed.

Notwithstanding the position taken by the Examiner, it is noted that various ones of claims 3, 14, and 19 depend directly or indirectly from various ones of claims 1, 2, and 18, and thus recite all of the features recited in claims 1, 2, and 18 together with further features of the present invention.

Accordingly, it is submitted that claims 3, 14, and 19 are patentable over Chow, Chandler, Isaacson, and Kano for at least the reasons discussed above that claims 1, 2, and 18 are patentable over Chow, Chandler, and Isaacson, and it is respectfully requested that the rejection of claims 3, 14, and 19 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, and 20-25, and further in view of Kano be withdrawn.

#### Claims 8, 15, and 26

Claims 8, 15, and 26 were rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, and 20-25, and further in view of Bichrt (U.S. Patent No. 6,162,300). This rejection is respectfully traversed.

Notwithstanding the position taken by the Examiner, it is noted that various ones of claims 8, 15, and 26 depend directly or indirectly from various ones of claims 1, 7, and 25, and

thus recite all of the features recited in claims 1, 7, and 25 together with further features of the present invention.

Accordingly, it is submitted that claims 8, 15, and 26 are patentable over Chow, Chandler, Isaacson, and Bichrt for at least the reasons discussed above that claims 1, 7, and 25 are patentable over Chow, Chandler, and Isaacson, and it is respectfully requested that the rejection of claims 8, 15, and 26 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, and 20-25, and further in view of Bichrt be withdrawn.

#### Claim 10

Claim 10 was rejected under 35 USC 103(a) as being unpatentable over Chow in view of either Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, and 20-25, and further in view of Okuda et al. (Okuda) (U.S. Patent No. 4,804,823). This rejection is respectfully traversed.

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose or suggest the features of claim 10 "wherein the cover heater is formed by printing a conductive paste on the surface of the cover and sintering the printed conductive paste, wherein the conductive paste comprises metal particles and metal oxide." However, the Examiner considers these features of claim 10 to be disclosed by Okuda, and is of the opinion that it would have been obvious to incorporate these features into Chow's device "to adapt Chow, as modified by Chandler or Isaacson, with the cover heater made of conductive paste having the metal particles and metal oxides to form a heating element that can provide a mechanically and thermally stable heater that can also withstand a high temperature."

Although the Examiner did not identify any particular portion of Okuda as support for the rejection, the most relevant passages of Okuda appear to be column 5, lines 26-30, of Okuda which reads as follows:

The heat-generating generator layer containing TiN is formed of a sintered body of (a) titanium nitride, (b) silicon nitride and (c) a sintering aid. As the sintering aid (c), there are used yttria, magnesia and alumina. An especially preferred example of the ceramic composition comprises 40 to 85% by weight of titanium

nitride, 20 to 54% by weight of silicon nitride and 1 to 10% by weight of the sintering aid.

and column 6, line 54, through column 7, line 4, of Okuda which reads as follows:

In accordance with still another embodiment of the present invention, the ceramic substrate is composed of a sintered body of silicon nitride and the heat-generating resistor is composed of a tungsten carbide layer. The heat-generating resistor layer of WC is prepared, for example, by sintering a paste containing WC alone.

In the examples of the present invention, the heat-generating resistor paste comprising substantially pure WC, that is, WC having a purity of 99.8%, was used. However, in order to adjust the resistance value of the heat-generating resistor, improve the denseness of the resistor or enhance the bondability to the silicon nitride substrate, up to about 40% by weight of a single substrate, oxide, nitride, carbide or carbonitride of an element of the group IIIA such as Y or an element of the group IIa such as Mg, or the same  $\text{Si}_3\text{N}_4$  as that of the silicon nitride substrate, may be added to WC. If such an additive is incorporated, the effects of the present invention are not degraded.

Tables 1, 3-4, and 8 in Okuda disclose various examples of the conductive pastes described in above portions of Okuda.

However, it is submitted that Okuda does not disclose or suggest the feature of claim 10 "wherein the conductive paste comprises metal particles and metal oxide" because all of the conductive pastes described in the above portions of Okuda and shown in Tables 1, 3-4, and 8 of Okuda comprise metal nitride particles (TiN) or metal carbide particles (WC) and metal oxide (yttria, magnesia, alumina), rather than "metal particles and metal oxide" as recited in claim 10.

Although Tables 2 and 8 of Okuda disclose conductive pastes that comprise "metal particles" (Mo or W) as recited in claim 10, these conductive pastes do not comprise "metal oxide" as recited in claim 10 as can be seen, for example, from column 8, lines 49-51; column 9, lines 67-68; column 13, lines 1-6; and column 15, lines 59-60, of Okuda.

Accordingly, for at least the reasons discussed above, it is submitted that Chow, Chandler, Isaacson, and Okuda do not disclose or suggest the feature of claim 10 "wherein the conductive paste comprises metal particles and metal oxide."

These same arguments were also presented in the amendment of September 7, 2005. In response to these arguments, the Examiner states as follows in the Office Action of November 17, 2005:

With respect to claim 10, . . . the recited elements are met under Okuda which clearly shows yttria or magnesia or alumina which are known as metal oxides.

However, the Examiner has apparently missed the point of the applicants' arguments. The applicants are not disputing that Okuda discloses "metal oxide" as recited in claim 10. However, claim 10 does not recite only "metal oxide." Rather, claim 10 recites that "the conductive paste comprises metal particles and metal oxide." The point of the applicants' arguments is that Okuda does not disclose this combination of "metal particles and metal oxides" recited in claim 10. Rather, Okuda discloses examples in which a conductive paste comprises the combination of metal nitride particles (TiN) and metal oxide, examples in which a conductive paste comprises the combination of metal carbide particles (WC) and metal oxide, and examples in which a conductive paste comprises only metal particles (either Mo or W). However, Okuda does not disclose a conductive paste which comprises the combination of "metal particles and metal oxides" recited in claim 10.

Accordingly, for at least the reasons discussed above, it is submitted that Okuda does not suggest the feature of claim 10 "wherein the conductive paste comprises metal particles and metal oxide."

Since Chow, Chandler, Isaacson, and Okuda do not disclose or suggest the feature of claim 10 discussed above, it is submitted that claim 10 is patentable over these references, and it is respectfully requested that the rejection of claim 10 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, and 20-25, and further in view of Okuda be withdrawn.

#### New Claims 27-29

It is submitted that Chow, Chandler, Isaacson, Kano, Bichrt, and Okuda do not disclose or suggest the features of new claim 27 depending from claim 1 "wherein the nozzle is a convergent-divergent nozzle through which the gaseous organic substance comes out from the main body in a diverging pattern, thereby enabling the heating crucible to produce a diverging

pattern of the gaseous organic substance" because Figs. 5 and 6 of Chow show that Chow's apertures 19 are straight apertures, and Figs. 5 and 6 and column 6, lines 36-50, of Chow disclose that Chow's heating crucible 10 produces a converging material beam.

It is submitted that Chow, Chandler, Isaacson, Kano, Bichrt, and Okuda do not disclose or suggest the features of new claim 28 depending from claim 1 "wherein the nozzle extends from a surface of the cover facing toward the main body to a surface of the heat-resistant layer facing away from the main body; wherein an entry opening of the nozzle through which the gaseous organic substance enters the nozzle is flush with the surface of the cover facing toward the main body; wherein an exit opening of the nozzle through which the gaseous organic substance exits from the nozzle is flush with the surface of the heat-resistant layer facing away from the main body; and wherein the nozzle converges from the entry opening to a throat of the nozzle at a junction between the cover and the heat-resistant layer, and diverges from the throat of the nozzle to the exit opening" because Figs. 5 and 6 of Chow show that Chow's apertures 19 are straight apertures.

It is submitted that Chow, Chandler, Isaacson, Kano, Bichrt, and Okuda do not disclose or suggest the features of new claim 29 depending from claim 1 "wherein the cover heater is a single-layer cover heater; and wherein the body heater is a single-layer cover heater" because Chow's cover heater is a three-layer cover heater formed by inner heating element 22' or 22", insulating layer 23' or 23", and outer heating element 24' or 24", and Chow's body heater is a three-layer body heater formed by first-layer heating element 22, insulating layer 23, and second-layer heating element 24.

For at least the reasons discussed above, it is submitted that new claims 27-29 are patentable over Chow, Chandler, Isaacson, Kano, Bichrt, and Okuda, and an indication to that effect is respectfully requested.

### Conclusion

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

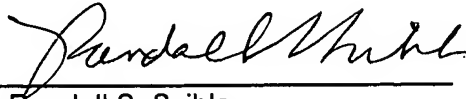
Serial No. 10/652,493

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Respectfully submitted,

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Date: 03/16/06

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